1. Determine whether the function below is 1-1.

$$f(x) = 36x^2 - 252x + 441$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. Yes, the function is 1-1.

E. No, because the range of the function is not $(-\infty, \infty)$.

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2. Determine whether the function below is 1-1.

$$f(x) = (3x + 19)^3$$

A. No, because the range of the function is not $(-\infty, \infty)$.

B. Yes, the function is 1-1.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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3. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 13$ and choose the interval that $f^-1(13)$ belongs to.

$$f(x) = 3x^2 - 2$$

A. $f^{-1}(13) \in [2.17, 2.58]$

B. $f^{-1}(13) \in [4.98, 5.3]$

C. $f^{-1}(13) \in [1.51, 2.17]$

D. $f^{-1}(13) \in [3.23, 3.35]$

E. The function is not invertible for all Real numbers.

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4. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = x^2 + 5x + 8 \text{ and } g(x) = \frac{3}{4x - 21}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-0.25, 6.75]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4, 9]$

C. The domain is all Real numbers except $x = a$, where $a \in [4.25, 9.25]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-5.4, -2.4]$ and $b \in [1.25, 9.25]$

E. The domain is all Real numbers.

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5. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -3x^3 - 2x^2 - 2x - 2 \text{ and } g(x) = -3x^3 - 2x^2 + 4x$$

A. $(f \circ g)(-1) \in [5, 14]$

B. $(f \circ g)(-1) \in [58, 65]$

C. $(f \circ g)(-1) \in [-3, 5]$

D. $(f \circ g)(-1) \in [65, 70]$

E. It is not possible to compose the two functions.

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6. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = \ln(x + 3) + 3$$

A. $f^{-1}(8) \in [151.41, 152.41]$

B. $f^{-1}(8) \in [59871.14, 59872.14]$

C. $f^{-1}(8) \in [151.41, 152.41]$

D. $f^{-1}(8) \in [141.41, 150.41]$

E. $f^{-1}(8) \in [59877.14, 59879.14]$

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7. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = x^3 - 4x^2 - 2x + 1 \text{ and } g(x) = -3x^3 - 4x^2 + 2x$$

A. $(f \circ g)(-1) \in [-59, -51]$

B. $(f \circ g)(-1) \in [4, 10]$

C. $(f \circ g)(-1) \in [6, 16]$

D. $(f \circ g)(-1) \in [-66, -64]$

E. It is not possible to compose the two functions.

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8. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 4x^4 + 6x^3 + 7x^2 + 7x + 8 \text{ and } g(x) = x^2 + 7x + 1$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [2.25, 7.25]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.25, 8.25]$

C. The domain is all Real numbers except $x = a$, where $a \in [-5.75, -3.75]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-10.33, -1.33]$ and $b \in [3.2, 6.2]$

E. The domain is all Real numbers.

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9. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -11$ and choose the interval that $f^-1(-11)$ belongs to.

$$f(x) = \sqrt[3]{2x + 3}$$

A. $f^{-1}(-11) \in [-665, -662.1]$

B. $f^{-1}(-11) \in [-669.5, -665.9]$

C. $f^{-1}(-11) \in [663.5, 665.9]$

D. $f^{-1}(-11) \in [666.6, 667.4]$

E. The function is not invertible for all Real numbers.

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10. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^{-}1(9)$ belongs to.

$$f(x) = e^{x+3} - 5$$

A. $f^{-1}(9) \in [-3.85, -3.55]$

B. $f^{-1}(9) \in [-2.87, -2.39]$

C. $f^{-1}(9) \in [5.29, 5.97]$

D. $f^{-1}(9) \in [-0.68, -0.23]$

E. $f^{-1}(9) \in [-3.3, -3.08]$
